

REMARKS

Applicant intends this response to be a complete response to the Examiner's **12 June 2007** Final Office Action. Applicant has labeled the paragraphs in his response to correspond to the paragraph labeling in the Office Action for the convenience of the Examiner.

DETAILED ACTION

Response to Amendment

1. Examiner acknowledges response filed 26 March 2007 containing amended claims 1, 2, 18, 19, and remarks.
2. Examiner acknowledges that amendments made to claim 18 overcome the previous duplicate claims warning issued between claims 1 and 18.
3. The previous rejection of claims 1-27 under 35 U.S.C. 102(b) is withdrawn in view of Applicant's arguments and amendments to the claims. Likewise, the previous rejection of claims 1-35 on the ground of nonstatutory obviousness-type double patenting is withdrawn in view of Applicant's arguments and amendments to the claims.
4. The previous rejection of claims 28-35 under 35 U.S.C. 102(b) is maintained. In addition, new grounds for rejection necessitated by Applicant's amendments to the claims are entered with respect to claims 2 and 19 under 35 U.S.C. 112, first paragraph; claims 1-10, 12, 15, and 18-27 under 35 U.S.C. 102(b); and claims 7-9, 11, 13, 14, 16, 17, and 27 under 35 U.S.C. 103(a) are entered. The rejections follow.

Claim Rejections - 35 USC § 112

6. **Claims 2 and 19** stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The Examiner contends as follows from the previous rejection:

Specifically, Examiner does not find support in Applicant's specification for the limitation "where the CH₂R groups are derived from the at least one aldehyde used in the reaction."

Applicant traverses this rejection and requests reconsideration. The specification at paragraph [0050] discloses that the aldehydes from which the CH₂R group is derived are of the formula R-CHO. Additionally, the application clearly states that the compounds are formed from

a reaction of an amine and an aldehyde. *See, e.g.*, [0002], [0006], [0007], [0021], [0032], [0033], [00044], [0046], [0050], [0057], *etc.* These reaction are known to convert the CHO moiety of the aldehyde group into a CH₂ moiety during the alkylation of the amine. Thus, the limitation is fully disclosed in the specification. Applicant, therefore, respectfully requests withdrawal of this rejection.

Claim Rejections - 35 USC § 102

7. **Claims 1-10, 12, 15, and 18-27** stand rejected under 35 U.S.C. 102(b) as being anticipated by Weers (US 5074991).

The Examiner contends as follows:

8. With respect to **claims 1 and 18**, Weers discloses contacting a fluid including noxious sulfur-containing species with an effective amount of a sulfur scavenging composition comprising substantially monomeric aldehyde-amine adducts formed from a reaction of a molar excess of an aldehyde or aldehyde donor and a secondary amine having at least one sterically bulk substituent (see Weers, column 2, lines 20-68; and column 3, lines 1-2 and 66-68; and column 4, line 1).

Applicant believes that the Examiner does not fully understand the monomeric limitation. The monomeric limitation means, as is clear from the specification and the examples, that each adduct of substantially all of the adducts include a single moiety derived from a single aldehyde and for each amino group in a single amine. In the formula (I) CH₂R – NR¹R², there is a single moiety, CH₂R, from the aldehyde RCHO and a single moiety, NR¹R², from the amine HNR¹R²; while in the formula (II) CH₂R – R⁴NR³NR⁵ – CH₂R, there is a single moiety, CH₂R, from the aldehyde R-CHO for each amino group of the diamine moiety. Thus, the monomeric term means that only one aldehyde reactions with each amino group of the amine.

On the other hand, Weers '991 is clear. The reaction product are not a monomeric composition as set forth in this application, but "[t]he secondary amine and the aldehyde are preferably combined in a mole ratio of about 2:1, i.e., the stiochiometric amount for the formation of diaminomethane with substantially no side products." Weers '991, Col. 4, ll. 15-20.

Moreover, the structure of Weers '991 R¹R²N – CH(R⁵) – NR³R⁴ is undeniably a reaction of two amine and one aldehyde. Under the conditions set forth in claims 1 and 18, this Weers '991 structure is simply not formed. The reactions of this invention are prepared in an excess of the aldehyde to substantially prevent this reaction – the reaction to form diaminomethanes – the Weers '991 compositions.

Applicants have added a clause to claims 1 and 18 to reinforce the meaning of monomeric in the context of this invention. It is clear that the term was meant to describe the number of aldehydes and amines that reaction – a one to one ratio. Weers '991 is a two to one ratio of amine to aldehyde. In the present invention, the use of an excess of aldehyde ensures that substantially all of the formed adducts are compounds derived from the reaction of a single aldehyde and a single amine.

Because Weers '991 does not disclose an amine-aldehyde adduct that is substantially amine-aldehyde adducts of a single amine and a single aldehyde – Weers '991 reactions are 2 amines to 1 aldehyde, the formation of which is substantially suppressed by the use of an excess of aldehyde, Weers '991 cannot anticipate claims 1 and 18. Applicant, therefore, respectfully requests withdrawal of this 102(b) rejection.

The Examiner contends as follows:

9. With respect to **claims 2-6, 19, and 23-26**, Weers discloses the use of aldehyde and amine species to produce a sulfur scavenging composition (see Weers, column 3, lines 5-50).

Applicant reiterates the arguments associated with claims 1 and 18 here. Again, Weers '991 simply does not disclose the adducts of this invention, and, in fact, the adducts of this invention cannot be prepared using the methods of Weers '991 that requires two moles of amine per mole of aldehyde in order to prepare the Weers '991 diaminomethane compounds. Applicant, therefore, respectfully requests withdrawal of this 102(b) rejection.

The Examiner contends as follows:

10. With respect to **claims 7 and 27**, Weers discloses wherein the sulfur scavenging composition comprises a solution including greater than 100 ppm of the aldehyde-amine reaction product, the remainder being a solvent (see Weers, column 4, lines 33-43).

Applicant reiterates the arguments associated with claims 1 and 18 here. Again, Weers '991 simply does not disclose the adducts of this invention, and, in fact, the adducts of this invention cannot be prepared using the methods of Weers '991 that requires two moles of amine per mole of aldehyde in order to prepare the Weers '991 diaminomethane compounds. Applicant, therefore, respectfully requests withdrawal of this 102(b) rejection.

The Examiner contends as follows:

11. With respect to **claims 8-10, 12, 15, and 20-22**, Weers discloses contacting a sulfur scavenging composition with a hydrocarbon containing hydrogen sulfide (see Weers, column 1, lines 39-46; column 2, lines 56-68; and column 3, lines 1-2).

Applicant reiterates the arguments associated with claims 1 and 18 here. Again, Weers '991 simply does not disclose the adducts of this invention, and, in fact, the adducts of this invention cannot be prepared using the methods of Weers '991 that requires two moles of amine per mole of aldehyde in order to prepare the Weers '991 diaminomethane compounds. Applicant, therefore, respectfully requests withdrawal of this 102(b) rejection.

12. **Claims 28-35** stand rejected under 35 U.S.C. 102(b) as being anticipated by Weers (EP 475641 A).

The Examiner contends as follows:

13. With respect to **claims 28 and 29**, Weers provides an inherent disclosure for contacting a sulfur scavenging composition *in a container*. Weers does not explicitly disclose use of a "container." Nevertheless, the person having ordinary skill in the art would recognize from Weers' disclosure that use of some sort of container is necessary to hold the sulfur-containing hydrocarbon to be treated by the sulfur scavenging composition. Likewise, the person having ordinary skill in the art would recognize that the sulfur scavenging composition could be added (or "contacted") with the hydrocarbon either prior to, after, or at the same time as adding the hydrocarbon to the "container."

14. With respect to claim 30, Weers discloses a sulfur scavenging composition comprising a solution including from about 5 wt.% to about 50 wt.% of the adducts, the remainder being a solvent (see Weers, page 5, lines 57-58).

15. With respect to claim 31, Weers discloses contacting a sulfur scavenging composition with a hydrocarbon containing hydrogen sulfide (see Weers, page 5, lines 53-54).

16. With respect to claims 32-34, Weers provides an inherent disclosure for introduction of a sulfur scavenging composition via a chemical tool, coiled tubing, or capillary coiled tubing (CCT). Weers does not provide an explicit disclosure for the means by which the sulfur scavenging composition is added to the sulfur-containing hydrocarbon to be treated. Nevertheless, the person having ordinary skill in the art would recognize that any suitable means could be used, be it by pouring (i.e. "batch introducing step"), by pumping the composition through a pipe, or other "chemical tool," "coiled tubing," or "capillary coiled tubing (CCT)."

17. With respect to claim 35, Weers discloses a sulfur scavenging composition comprising a solution including from about 5 wt.% to about 50 wt.% of the adducts, the remainder being a solvent (see Weers, page 5, lines 57-58).

Applicant understands that the method of Weers EP can be practiced in a container, but are somewhat perplexed as the Examiner withdrew the rejection of the composition over Weers EP. The

method is novel and non-obvious over Weers EP because the compositions are novel and non-obvious over Weers EP. Applicant believe that the CAFC has made it clear the a method practiced with a patentable composition is *per se* patentable. Applicant, therefore, respectfully requests withdrawal of these section 102(b) rejection over Weers EP.

Claim Rejections - 35 USC § 103

18. **Claims 7-9, 11, 13, 14, 16, 17, and 27** stand rejected under 35 U.S.C. 103(a) as being unpatentable over Weers (US 5074991).

The Examiner contends as follows:

19. With respect to **claims 7 and 27**, Weers discloses wherein the sulfur scavenging composition comprises a solution including greater than 100 ppm of the aldehyde-amine reaction product, the remainder being a solvent.

Weers does not disclose wherein the composition comprises a solution including from about 5 wt% to about 50 wt% of the adducts the remainder being a solvent.

However, in the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, *a prima facie* case of obviousness exists. See MPEP § 2144.05.

Applicant believes that the Examiner does not fully understand the monomeric limitation. The monomeric limitation means, as is clear from the specification and the examples, that each adduct of substantially all of the adducts include a single moiety derived from an single aldehyde and for each amino group in a single amine. In the formula (I) $\text{CH}_2\text{R} - \text{NR}^1\text{R}^2$, there is a single moiety, CH_2R , from the aldehyde RCHO and a single moiety, NR^1R^2 , from the amine HNR^1R^2 ; while in the formula (II) $\text{CH}_2\text{R} - \text{R}^4\text{NR}^3\text{NR}^5 - \text{CH}_2\text{R}$, there is a single moiety, CH_2R , from the aldehyde R-CHO for each amino group of the diamine moiety. Thus, the monomeric term means that only one aldehyde reactions with each amino group of the amine.

On the other hand, Weers '991 is clear. The reaction product are not a monomeric composition as set forth in this application, but "[t]he secondary amine and the aldehyde are preferably combined in a mole ratio of about 2:1, i.e., the stiochiometric amount for the formation of diaminomethane with substantially no side products." Weers '991, Col. 4, ll. 15-20.

Moreover, the structure of Weers '991 $\text{R}^1\text{R}^2\text{N} - \text{CH}(\text{R}^5) - \text{NR}^3\text{R}^4$ is undeniably a reaction of two amine and one aldehyde. Under the conditions set forth in claims 1 and 18, this Weers '991 structure is simply not formed. The reactions of this invention are prepared in an excess of the aldehyde to substantially prevent this reaction – the reaction to form diaminomethanes – the Weers '991 compositions.

Applicants have added a clause to claims 1 and 18 to reinforce the meaning of monomeric in the context of this invention. It is clear that the term was meant to describe the number of aldehydes and amines that reaction – a one to one ratio. Weers '991 is a two to one ratio of amine to aldehyde. In the present invention, the use of an excess of aldehyde ensures that substantially all of the formed adducts are compounds derived from the reaction of a single aldehyde and a single amine.

Because Weers '991 does not disclose an amine-aldehyde adduct that is substantially amine-aldehyde adducts of a single amine and a single aldehyde – Weers '991 reactions are 2 amines to 1 aldehyde, the formation of which is substantially suppressed by the use of an excess of aldehyde, Weers '991 cannot render claims 7-9, 11, 13, 14, 16, 17, and 27 obvious. In fact, Weers '991 can be viewed as teaching firmly away from the present invention, because, the compositions of this invention cannot be prepared using the method of Weers '991 as that method makes Weers '991 diaminomethanes. Applicant, therefore, respectfully requests withdrawal of these 103(a) rejections.

The Examiner contends as follows:

20. With respect to **claims 8, 9, 11, 13, 14, 16, and 17** Weers does not disclose wherein the fluid comprises an inverted mud or drilling fluid; overbalanced inverted drilling fluid, weighted inverted drilling fluid, or underbalanced drilling fluid; gasoline, kerosene, jet fuels, diesels, stabilized condensates, and LPG; heavy oil fraction from recovery of bitumens, processed mineral oil, process mined extract, bunker C, or a heavy fuel; lubricating oil; packer fluid; storage fluid or a pickling fluid.

However, Weers discloses the use of a sulfur scavenging composition comprising substantially monomeric aldehyde-amine adducts formed from a reaction of a molar excess of an aldehyde or aldehyde donor and a secondary amine having at least one sterically bulk substituent (see Weers, column 3, lines 5-50). Weers discloses the use of such composition with hydrocarbon liquids and gases containing hydrogen sulfide, including natural gases or off gases from the production, transport, storage, and refining of crude oil, as well as petroleum residues (see Weers, column 1, lines 39-46). Thus, Weers's disclosure is broad enough to encompass the use of such compositions to treat *any* hydrocarbon stream or material that contains hydrogen sulfide contaminants.

Therefore, the person having ordinary skill in methods for removing hydrogen sulfide would have been motivated to use the compositions disclosed by Weers to treat the fluids named in claims 8, 9, 11, 13, 14, 16, and 17 because all are hydrocarbon fluids.

Finally, the person having ordinary skill in methods for removing hydrogen sulfide would have had a reasonable expectation of success because (1) Weers is directed to the removal of hydrogen sulfide contaminants from hydrocarbon liquids

and gases, and (2) all of the fluids named in claims 8, 9, 11, 13, 14, 16, and 17 are hydrocarbon fluids.

Thus, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to use the sulfur scavenging composition of Weers to remove hydrogen sulfide from the hydrocarbon fluids named in claims 8, 9, 11, 13, 14, 16, and 17.

Applicant reiterates the arguments associated with claims 7-9, 11, 13, 14, 16, 17, and 27 here. Again, Weers '991 simply does not disclose the adducts of this invention irrespective of their use, and, in fact, the adducts of this invention cannot be prepared using the methods of Weers '991 that requires two moles of amine per mole of aldehyde in order to prepare the Weers '991 diaminomethane compounds. Applicant, therefore, respectfully requests withdrawal of these 103(a) rejections.

Response to Arguments

21. Applicant's arguments, filed 26 March 2007, with respect to claims 1-35 have been fully considered and are persuasive. Consequently, the previous rejection of claims 1-27 under 102(b), and claims 1-35 on the ground of nonstatutory obviousness-type double patenting has been withdrawn.

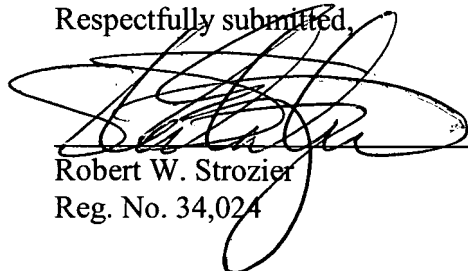
Having fully responded to the Examiner's Non-Final Office Action, and noting the the reference simply do not teach adducts formed from the reaction of a single aldehyde with a single amine to form adduct of formulas (I) and (II). Applicant respectfully urges that is application be passed onto allowance.

The Commissioner is authorized to credit or debit deposit account no. 501518 for any fees due or overpayments made.

If it would be of assistance in resolving any issues in this application, the Examiner is kindly invited to contact applicant's attorney Robert W. Strozier at 713.977.7000

Date: **October 12, 2007**

Respectfully submitted,



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